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Agenda Item 3: Air Navigation Services
3.1 CNS/ATM

SAFETY MANAGEMENT SYSTEMS

(Presented by the Secretariat)

SUMMARY

In this Working Paper information is provided on the relevant aspects of a safety management system (SMS) for States to develop an action plan for its implementation.

References:

- Doc 7300 - Convention on International Civil Aviation - 7th ed.
- Annex 11 - Air Traffic Services
- Annex 14 - Aerodromes
- Doc 4444 - Air Traffic Management
- Doc 9854 - Global Air Traffic Management Operational Concept
- Doc 9774 - Manual on Certification of Aerodromes
- Manual on Safety Management for aerodromes and air traffic services (draft version).

1. Introduction

1.1 Safety is considered as the most important activity of global aviation, and it is reflected in the targets and objectives of ICAO. Based on Article 44 of the Convention on Civil aviation (Doc. 7300), ICAO is entrusted with fostering a safe and orderly growth of civil aviation throughout the world.

1.2 In Annex 11— *Air Traffic Services* and in Annex 14 — *Aerodromes* the requirements concerning the adoption of safety management systems (SMSs) may be found. These requirements demand that the States implement suitable programmes for safety management. The target levels of safety (TLS) will be established through regional air navigation agreements, as appropriate.

1.3 In accordance with Annex 14, Volume I, since 27 November 2003, the States must certify all the international operations aerodromes and from 24 November 2005 on all the certified aerodromes must count with an implemented safety management system, foreseeing the establishment of runway safety programmes. The guidelines on the safety management system in the aerodromes appear in the *Manual on Certification of Aerodromes* (Doc 9774).

1.4 In the second amendment to Doc 4444, PANS-ATM, applicable since November 2003, it is stated that States should establish systemic and suitable ATS safety management programmes with defined levels and objectives. Moreover, prior to any significative change to the safety-related ATC system, including the implementation of reduced separation minimum or a new procedure, a safety assessment will be carried out, proving that an acceptable safety level may be obtained.

1.5 The AN-Conf/11 adopted a systemic and explicit approach integrated for safety management within all the system, where each element of the system must be subject to an individual analysis, interacting with others as part of a bigger system, as indicated in the following definition:

***System safety approach.** A systematic and explicit approach defining all activities and resources (people, organizations, policies, procedures, time spans, mile stones, etc.) devoted to the management of safety management. This approach starts before the fact, is documented, planned and explicitly supported by documented organizational procedures endorsed by the highest executive levels. The system safety approach uses systems theory, systems engineering and management tools to manage risk formally, in an integrated manner, across all organizational levels, all disciplines and all system life-cycle phases.*

2 Analysis

2.1 The Global Aviation Safety Plan (GASP), included in the ICAO website (www.icao.int/icao/en/anb), is established as the mechanism allowing the coordination and consolidated reporting of safety-related activities conducted throughout the world and at the same time presents an overview of all these activities in a single document. The objectives of the Global Aviation Safety Plan (GASP) are to:

- a) reduce the number of accidents and fatalities, irrespective of the volume of air traffic; and
- b) achieve a significant decrease in worldwide accident rates, emphasizing on regions where the latter remain high.

2.2 Regional and national safety performance targets for ATS should take these objectives into consideration, to ensure that they will contribute to fulfill these global objectives. To this end, among the activities within the GASP coordinated by ICAO for the reduction of the number of accidents in all the world are the following:

- a) to continue the activities regarding controlled flight into terrain CFIT for the reduction of accidents during approach and landing, including the development of avionics, operational procedures and training;

- b) the requirements the airborne collision avoidance system (ACAS), emphasizing the use of the correct operational procedures;
- c) Establishment of ATM safety management systems and of aerodromes;
- d) introduction to the human factors aspects as per ICAO provisions;
- e) to continue updating ICAO SARPs, PANS and guidance material;
- f) conduction of audits depending on the framework of the universal safety oversight programme (USOAP);
- g) carry out an educational and awareness campaign on safety of runways and improper entrance in runway; and
- h) the establishment of the requirement of a minimum proficiency of the aeronautical language used in radiotelephonic communications.

2.3 In order to support this purpose, the implementation in the NAM, CAR and SAM Regions of ATS Quality Assurance Programmes has proved to be an efficient tool fostering the establishment of diverse complementary programmes for the assessment of ATS performance such as verification and training for ATC proficiency; incident reporting and investigation; verification of the use of aeronautical phraseology and incident prevention.

2.4 Nowadays, several States require additional guidance especially with regard to issues such as the establishment of acceptable safety levels and of safety assessments. Consequently, the AN-Conf/11 supported the development of a joint document that could be available for the States perusal: the *Manual on safety management for aerodromes and air traffic services*, whose objective is to assist States in the implementation of an SMS.

2.5 The manual, as a joint document, represents the first stage in the adoption process of a harmonized approach with regard to safety management based on systems, described in the global ATM operational concept, organized in such a way that the aerodromes as well as ATS common basic principles of safety management are dealt with firstly, such as:

- a) factors affecting safety in the system, granting special importance to human errors;
- b) the importance of matters regarding the organization, including the responsibility and the oversight concerning performance with regard to safety, as well as the need for counting with a safety culture;
- c) safety assessment procedures;
- d) the responsibilities of the State regulatory authority and the need for separating safety responsibilities linked to the regulatory duty and the ATS provision duty; and
- e) ensuring the system's safety through audits and supervision.

2.6 That manual has specific sections for the implementation of the safety general principles in aerodromes and in ATS. The implementation of an SMS requires the definition of performance objectives and the establishment of mechanisms allowing to prove that those objectives are met. To that end, it is necessary to establish:

- a) safety indicators applicable in harmony to all the aeronautical system, emphasizing the development of additional predictive indicators to those expressing the safety level fulfilled;

- b) safety objectives for the system as a whole;
- c) guidelines of the acceptable safety levels for all the elements of the system and the parameters to express it;
- d) guidelines on the way to deal with safety responsibility within an organization and the need for counting with documentation on related decisions;
- e) suitable mechanisms to watch safety indicators and to ensure that there is backfeeding on learning and control, such as the universal safety oversight programme (USOAP), to ensure that corrective measures are applied in sectors where safety problems are detected; and
- f) programmes for all the organizations to develop a positive safety culture, recognizing that accidents are not only due to a mere coincident occurrence of multiple failures not dealt with, but also to the passage of organizations towards an unsafe performance.

Organizational culture

2.7 An organizational culture can be defined as:

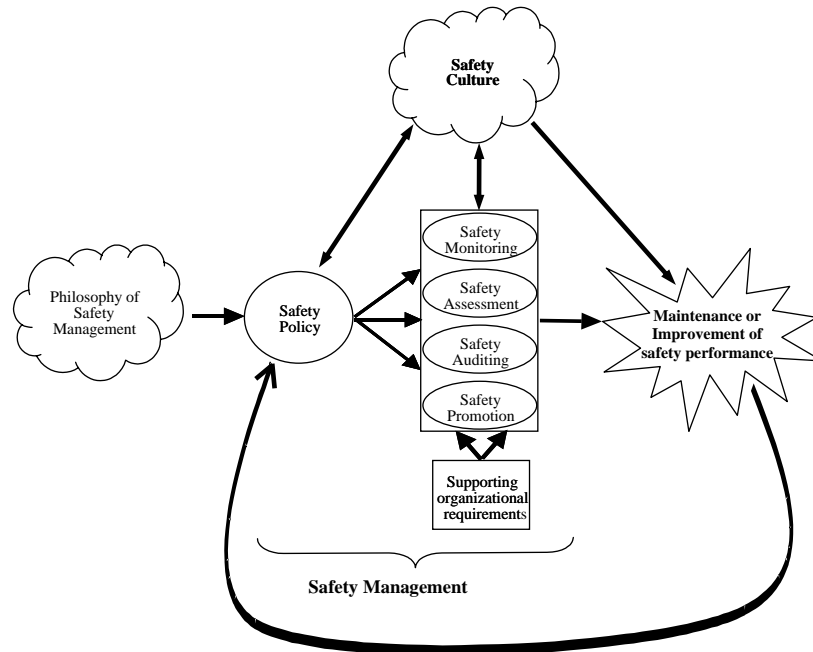
The shared values, attitudes and beliefs of the staff of the organization, which interact with the structure of the organization to shape the accepted patterns of behaviour.

2.8 There is a close correlation between the philosophy of safety management and this concept of a safety culture (ref. WP/29); philosophy defines a way of thinking about safety. The safety culture is result of this way of thinking being translated into actions, so that the organizational culture becomes safety-oriented. Safety policy provides the starting point for the development of a safety culture. The characteristics of an organization with a positive safety culture include:

- a) senior management places a strong emphasis on safety as part of the strategy of controlling risks;
- b) decision makers and operational personnel hold a realistic view of the short- and long-term hazards involved in the organization's activities;
- a) managers in top positions do not use their influence to force their views or to avoid criticism;
- b) managers in top positions foster a climate with a positive attitude towards criticism, comments and feedback from lower levels of the organization;
- c) awareness of the importance of communicating relevant safety information at all levels of the organization is present (both within it and with outside entities);
- d) promotion of appropriate, realistic and workable rules relating to hazards, safety and potential sources of damage, with such rules being supported and endorsed throughout the organization;
- e) personnel are well trained and understand the consequences of unsafe acts; and
- f) there is a low incidence of risk taking behaviour, and a safety ethic which discourages such behaviour.

2.9 A system for the management of SMS includes the organizational structure, responsibilities, procedures, processes and provisions for the implementation of safety policies in order to provide for the control of safety. The requirements, procedures and practices which make up the safety management system can be grouped under the following headings:

- a) the organization’s safety policy;
- b) the core safety management activities, which are:
 - safety monitoring;
 - safety assessment;
 - safety auditing;
 - safety promotion; and
- c) supporting organizational requirements, which include:
 - the safety management organizational structure;
 - the role of the safety manager;
 - safety responsibility and accountability; and
 - training and competency of personnel.



The relationship between these various components of a safety management system.

3. Conclusion

3.1 In spite of the activities developed to enhance safety, it is necessary that States continue participating more actively in the activities carried out by ICAO within the GASP, in order to include improvements to the safety systems through the implementation of systemic and appropriate programmes.

4 Measures recommended to the meeting

4.1 It is suggested that the Meeting approve the following:

CONCLUSION 2/x IMPLEMENTATION OF A SAFETY MANAGEMENT SYSTEM

That the States/Territories/International Organizations of the NAM and CAR Regions that have not yet done so:

- a) develop an action plan to implement by 31 August 2006 a safety management system through systemic and appropriate programmes;
- b) establish the acceptable levels and objectives with regard to safety, within airspaces and aerodromes under their jurisdiction; and
- c) participate in the activities carried out by ICAO in order to foster the implementation of a safety management system.

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